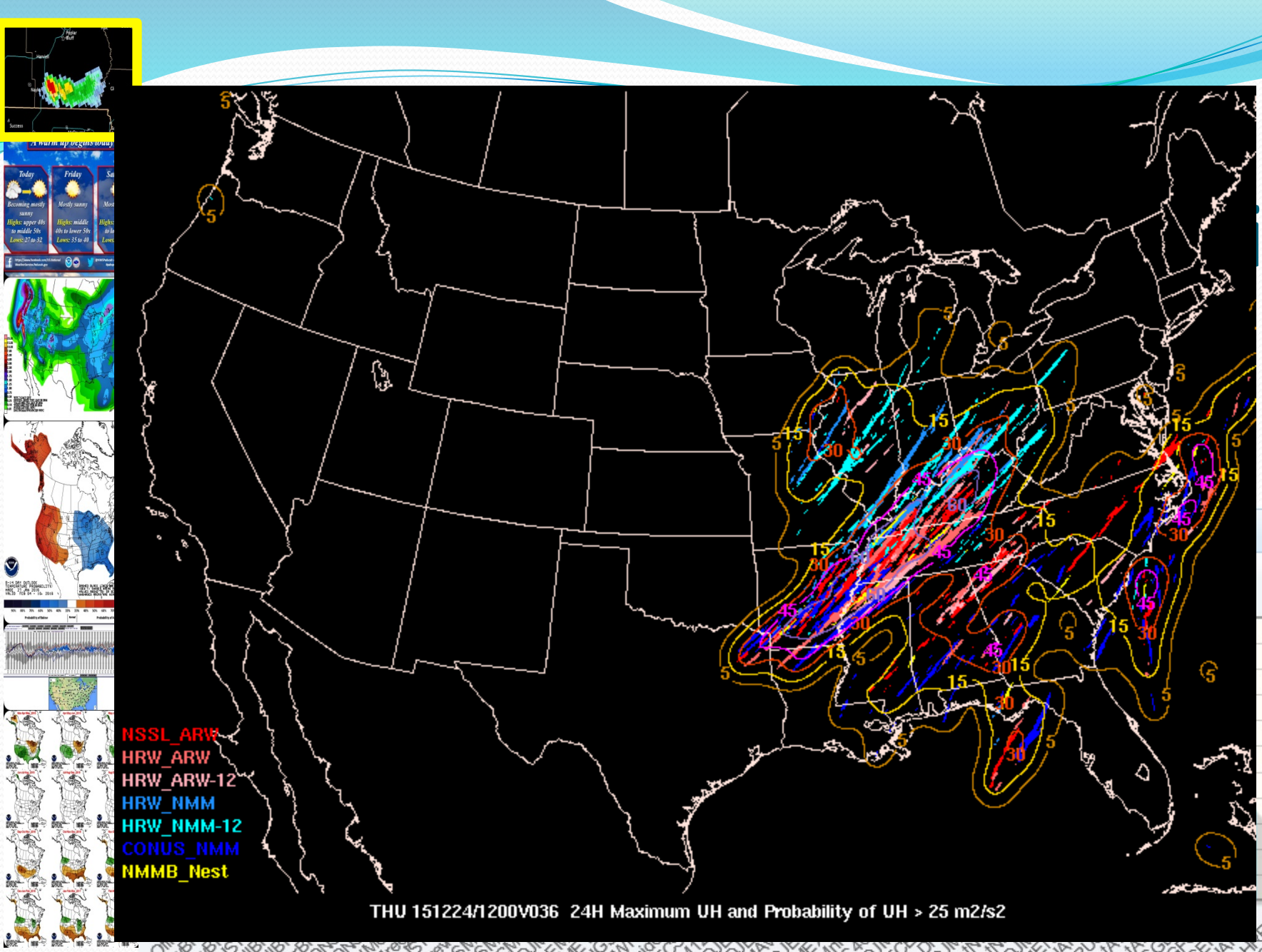
Forecasting

From Daily to Seasonal

Pat Spoden
SOO NWS Paducah, KY
DEWS Workshop
St. Louis, MO (Feb 2016)
Special Thanks to Jon **Gottschalck/Jim Noel**


NSSL_ARW
HRW_ARW
HRW_ARW-12
HRW_NMM
HRW_NMM-12
CONUS_NMM
NMMB_Nest
THU 151224/1200V036 24H Maximum UH and Probability of UH > 25 m2/s2

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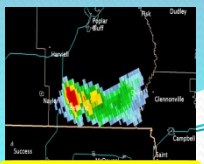
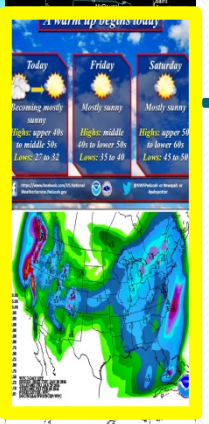
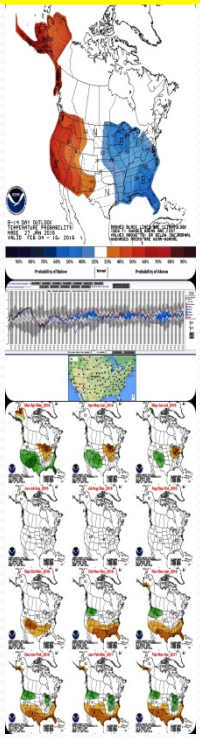






7 Day Forecasts

- Mix of models/blends
  - Experts
    - SPC (severe weather)
    - WPC (rainfall/snowfall and other parameters)
  - Start to bring in more ensemble data
    - Anomolies (compare current model forecasts to 30 (60) years of data
      - Look for 2 standard deviation or more in fields for significant event

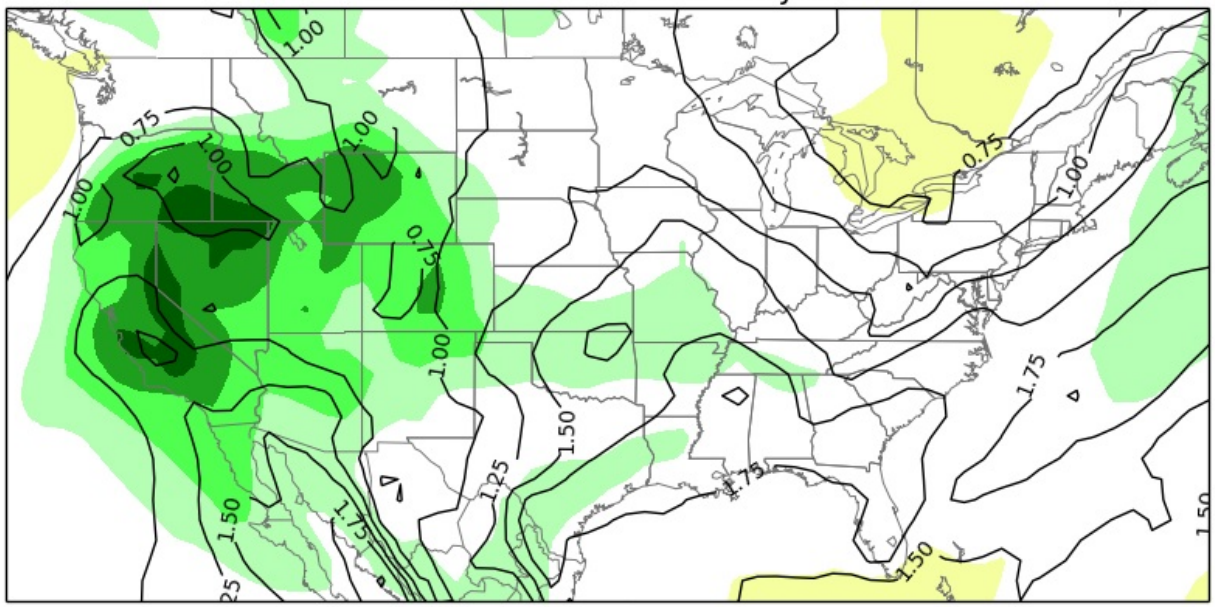
Model Run: Jun 26, 2015 00Z | **Table Region:** PAH | **Plot Region:** Continental U.S. | **Output:** GEFS M-Climate Percentile | View Table

Fcst Hr: 144 Valid: Wed Jul 1 7:00 PM CST

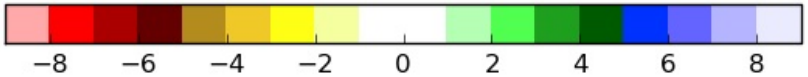
WFO PAH Table Jun 26, 2015 00Z Run

			Z	T	SLP	PW
0	Fri 26th	00Z	AVG	AVG	AVG	99
6		06Z	AVG	90	AVG	97.5
12		12Z	AVG	90	AVG	97.5
18		18Z	AVG	90	AVG	97.5
24	Sat 27th	00Z	AVG	AVG	10	97.5
30		06Z	10	10	1	90
36		12Z	10	10	1	AVG
42		18Z	2.5	10	10	10
48	Sun 28th	00Z	2.5	1	AVG	10
54		06Z	2.5	2.5	AVG	10
60		12Z	2.5	2.5	AVG	10
66		18Z	2.5	2.5	AVG	10
72	Mon 29th	00Z	2.5	10	AVG	10
78		06Z	2.5	10	AVG	AVG
84		12Z	10	10	10	AVG
90		18Z	10	10	AVG	AVG
96	Tue 30th	00Z	10	AVG	AVG	AVG
102		06Z	2.5	10	AVG	10
108		12Z	10	AVG	AVG	AVG
114		18Z	AVG	AVG	AVG	AVG
120	Wed 1st	00Z	AVG	AVG	AVG	AVG
126		06Z	AVG	AVG	AVG	AVG
132		12Z	AVG	AVG	AVG	AVG
138		18Z	AVG	AVG	AVG	AVG
144	Thu 2nd	00Z	AVG	AVG	AVG	90
150		06Z	AVG	AVG	AVG	90
156		12Z	AVG	AVG	10	90
162		18Z	AVG	AVG	10	90
168	Fri 3rd	00Z	10	AVG	2.5	90
174		06Z	10	AVG	10	AVG
180		12Z	10	AVG	10	AVG
186		18Z	AVG	AVG	10	AVG
192	Sat 4th	00Z	10	AVG	10	AVG

GEFS Mean Precipitable Water (in) and M-Climate Anomaly
HOUR 144 - VALID 00:00 UTC Thu Jul 02 2015



relative to 144-h GEFS reforecasts
initialized 21-Jun to 12-Jul (1985-2012)



Current conditions at

St. Louis, Lambert-St. Louis International Airport (KSTL)

Lat: 38.66°N **Lon:** -90.23°W **Elev:** 604ft.

Partly Cloudy

35°F

2°C

Humidity	72%
Wind Speed	SW 3 mph
Barometer	30.05 in (1018.2 mb)
Dewpoint	27°F (-3°C)
Visibility	10.00 mi
Last update	29 Jan 8:51 am CST

More Information:

- Local Forecast Office
- More Local Wx
- 3 Day History
- Mobile Weather
- Hourly Weather Forecast

Extended Forecast for

3 Miles NNE Saint Louis MO

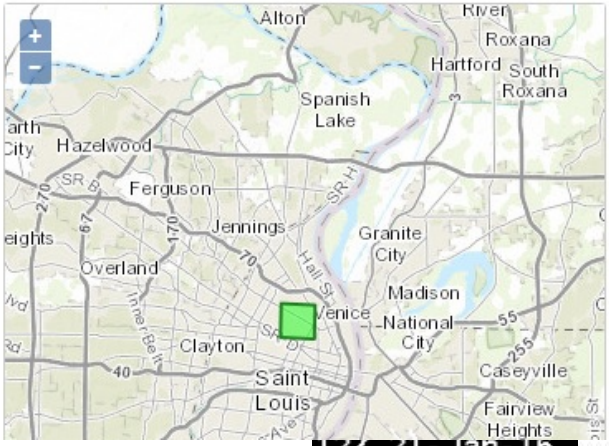
Today	Tonight	Saturday	Saturday Night	Sunday	Sunday Night	Monday	Monday Night	Tuesday
				30%	20%	30%	70%	70%
Sunny	Partly Cloudy	Mostly Sunny	Mostly Cloudy	Chance Showers	Slight Chance Showers	Chance Rain	Rain Likely	Showers Likely
High: 49 °F	Low: 39 °F	High: 59 °F	Low: 48 °F	High: 62 °F	Low: 40 °F	High: 50 °F	Low: 43 °F	High: 55 °F

Detailed Forecast

Today	Sunny, with a high near 49. Light and variable wind becoming southeast 6 to 11 mph in the morning.
Tonight	Partly cloudy, with a low around 39. South wind 7 to 13 mph.
Saturday	Mostly sunny, with a high near 59. Southwest wind 5 to 7 mph becoming southeast in the afternoon.
Saturday Night	Mostly cloudy, with a low around 48. South wind 6 to 9 mph.
Sunday	A 30 percent chance of showers. Mostly cloudy, with a high near 62. South wind 9 to 17 mph becoming west in the afternoon.
Sunday Night	A 20 percent chance of showers. Mostly cloudy, with a low around 40.
Monday	A 30 percent chance of rain. Mostly cloudy, with a high near 50.
Monday Night	Rain likely, with thunderstorms also possible after midnight. Cloudy, with a low around 43. Chance of precipitation is 70%.

Topographic

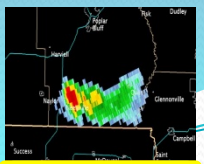
Click Map For Forecast

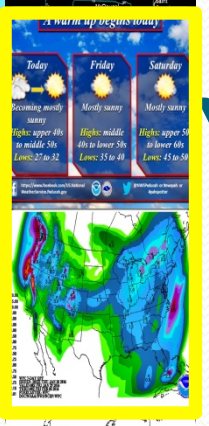


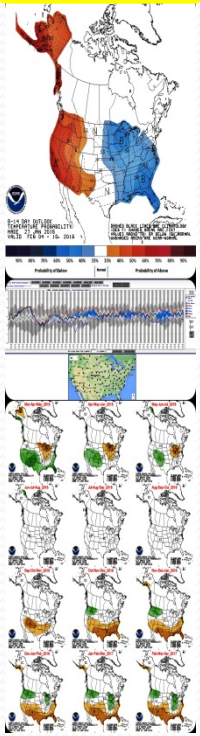
Friday, February 20 at 7pm

Temperature: 26 °F Dewpoint: 23 °F Wind Chill: 16 °F Surface Wind: S 10mph

122 21-Jan-16

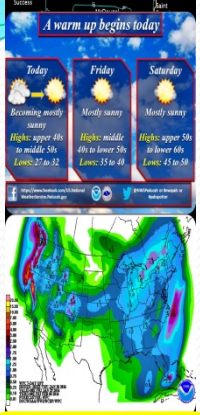


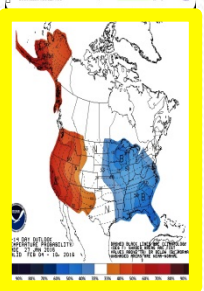


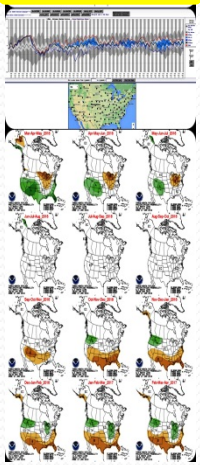


Your Forecast

- NWS sends out all data/forecasts for free (tax)
- Private companies/individuals can use/ manipulate/change any way they want
- You can see this via TV/ listen on radio/ Internet
- Do you know where your forecast is coming from?

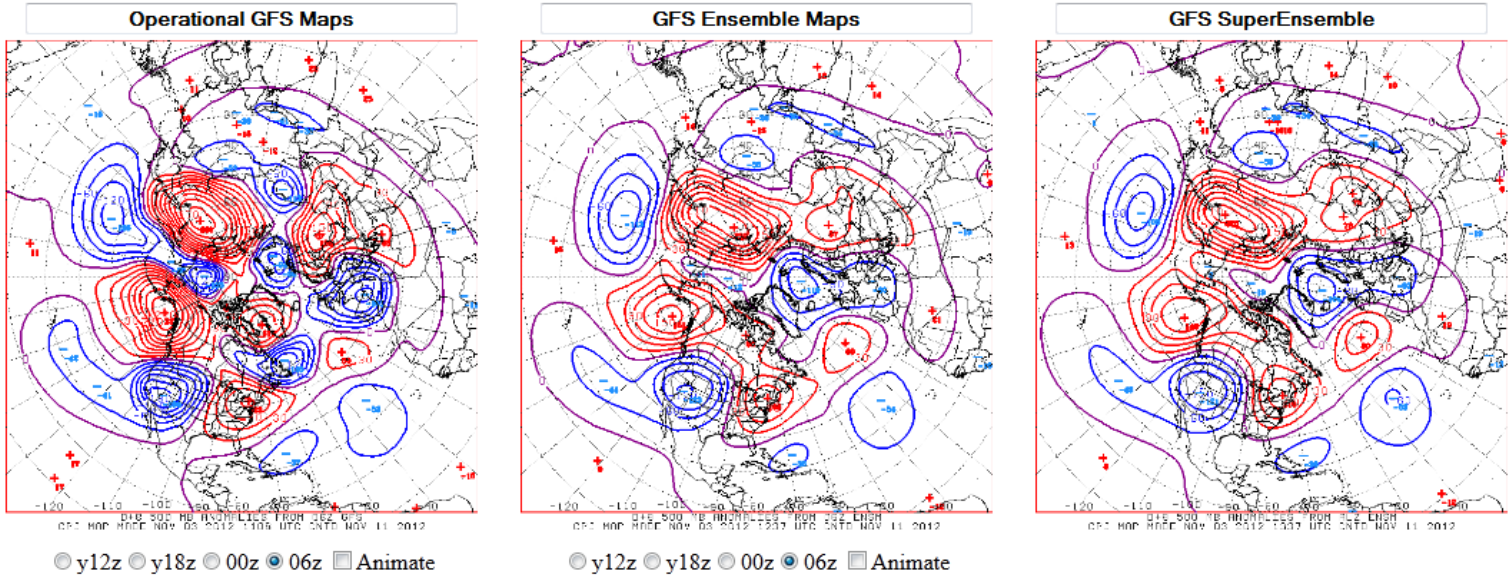


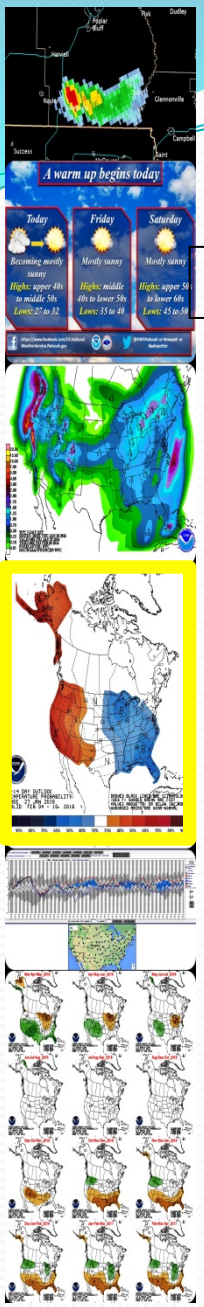




Days 8-14

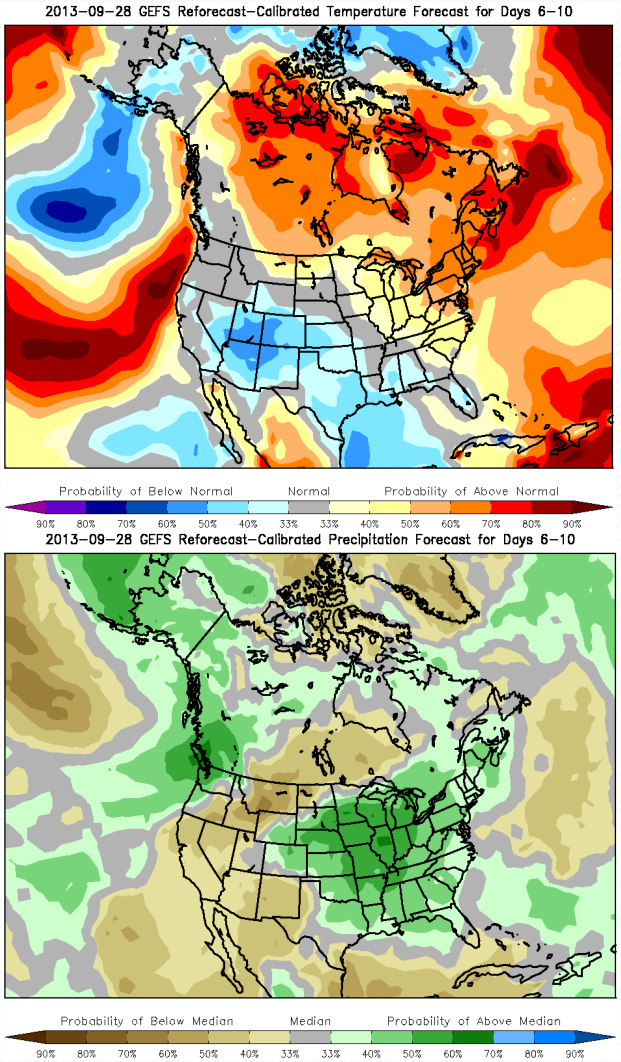
- <u>Forecaster considerations:</u>
- Overall model system agreement
- Ensemble spread
- Run-to-run continuity, outliers
- Consistency with tropical forcing?
- Slowly evolving boundary conditions (snow, soil moisture, local SSTs)



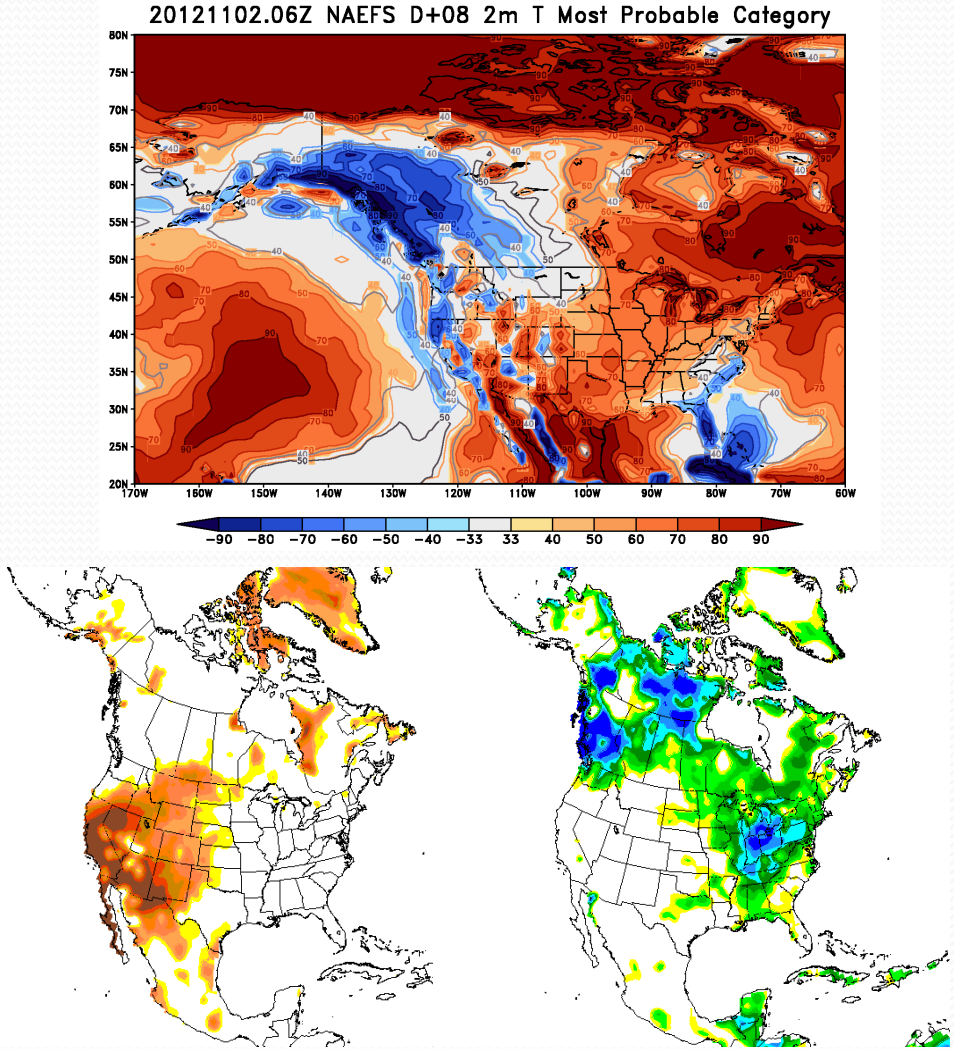


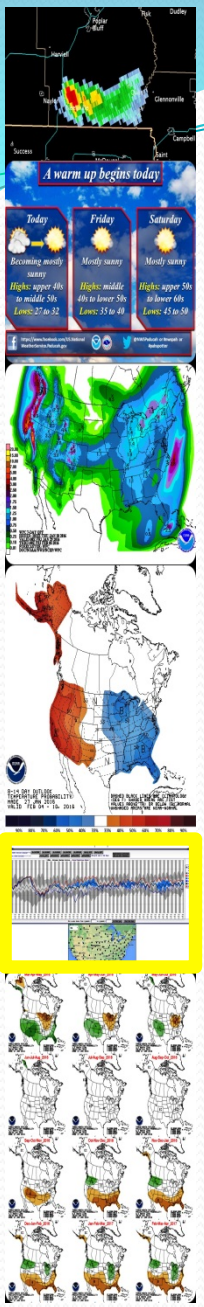
8-14 Day

ESRL Reforecast – Hindcast Calibration



NAEFS –Recent Conditions

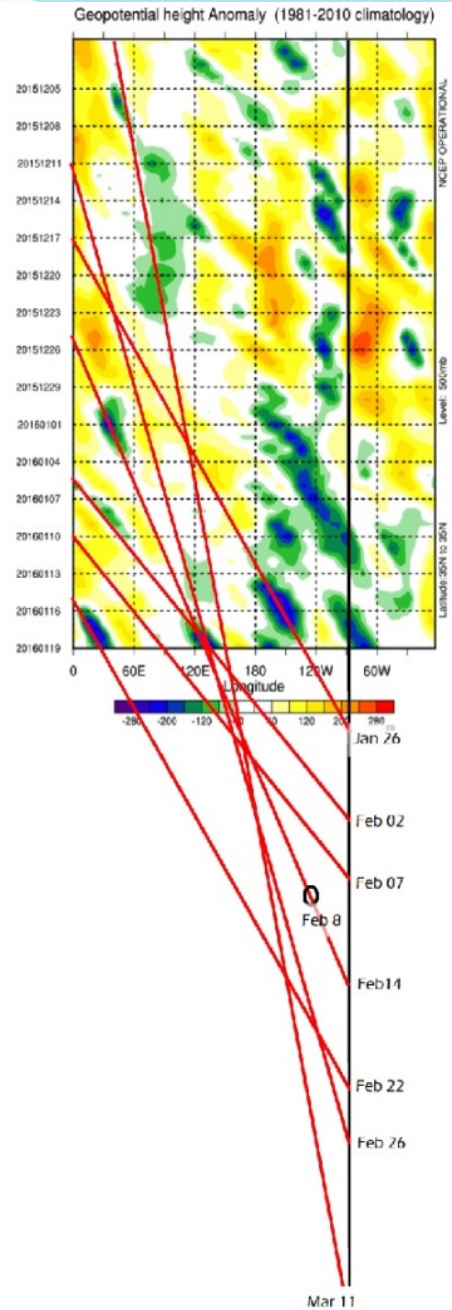




Newer Ideas

Hovmoller Diagrams

Also takes in global and regional oscillations.



Jan 21 — Mar 22, 2016

The following dates are the analyzed signal crossings through 35N/90W:

Jan 26 [5 days]: Within the conventional forecast window. See latest local forecast.

Feb 2 [12 days]: A well established signal with amplification taking place currently west of the IDL. This is being correlated with the SPC Severe Convective Parameter indications for severe weather potential during this time-frame but may be more favored south of 35N.

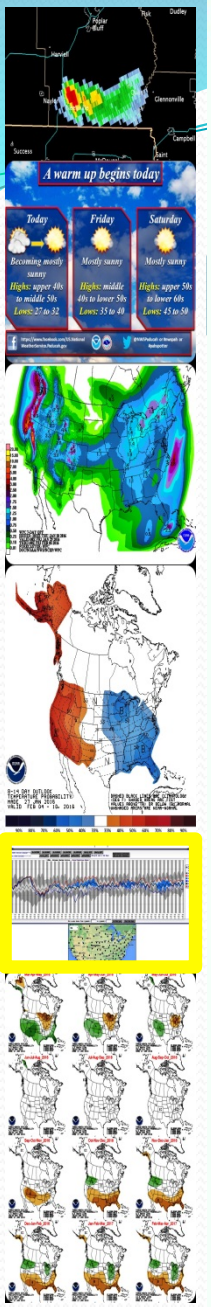
Feb 7 [17 days]: Yet another signal to emanate from a what should be a deep anchor position near the IDL near the end of January. The phase speed may be altered due to spectral interactions with other signals near the IDL, but may have some residual energy for a clipper system to move through the middle of the nation around this time-frame. This crossing is an adjustment from HovRep #1 that had passage around Feb 9th.

Feb 14 [24 days]: This signal moves through with some impactful weather anticipated in the middle of the nation for Valentine's Day. ***This is the same signal that passes through the Super Bowl venue late on the 7th (00Z of the 8th) and indicated by the circle on the trace. First blush would suggest a hail threat, but a review of severe weather climatology indicates no past history of hail in February in the Santa Clara area. Let's call it a very low end non-zero chance for weather on Super Bowl Sunday.***

Feb 22 [32 days]: A well-established signal that projects passage for around the 22nd, but may be altered by anchor amplification off the Pacific coast prior to arrival.

Feb 26 [33 days]: A steep sloped passage for cold air implications at the end of February.

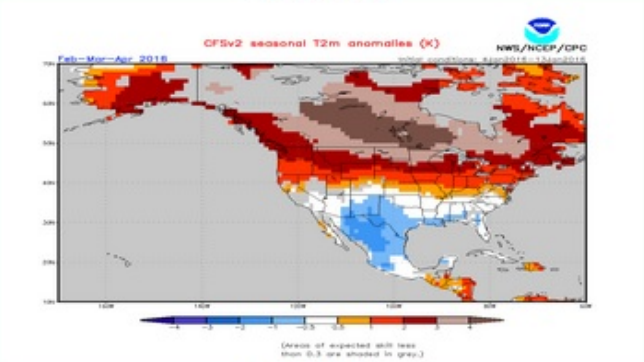
Mar 11 [50 days]: A steep Wave 3 signal that may be dampened considerably by capillary processes, but may have some memory for late season cold air influences. *HR*



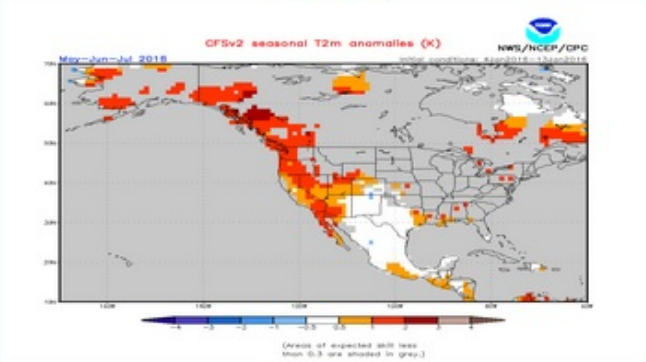
CFSv2 forecast seasonal T2m anomalies with skill mask

ICs: 20160103 - 20160113

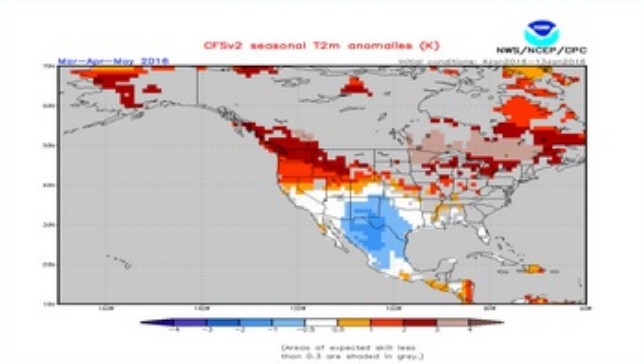
FMA 2016



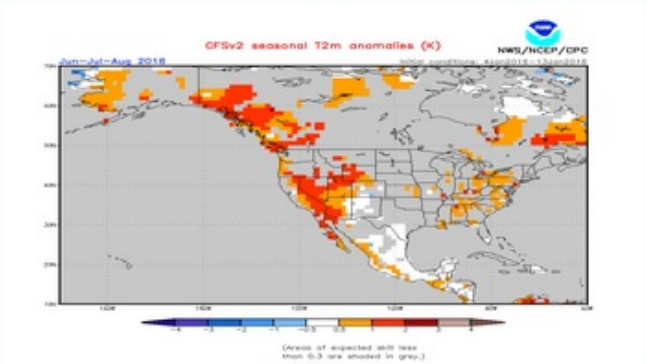
MJJ 2016



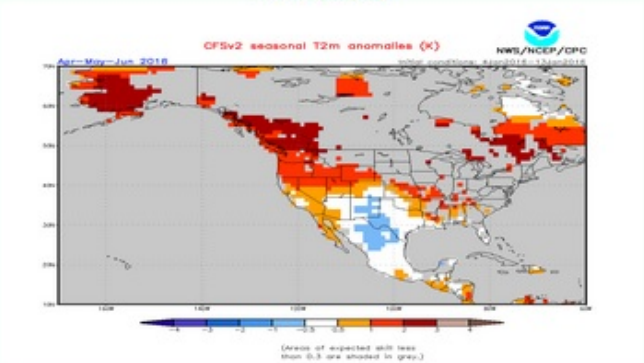
MAM 2016



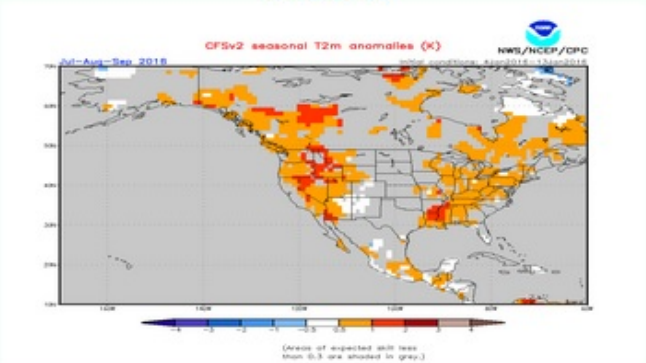
JJA 2016

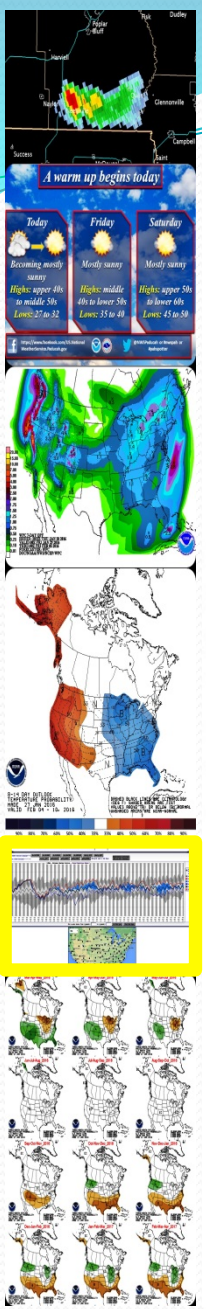


AMJ 2016

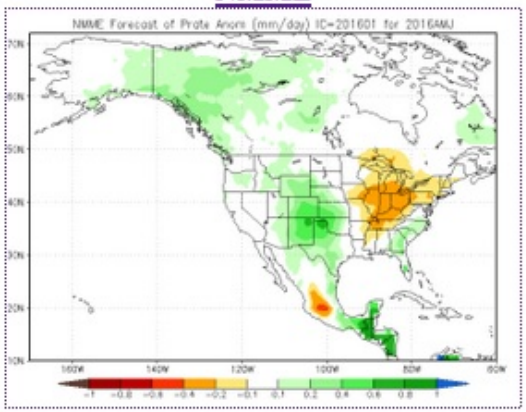


JAS 2016

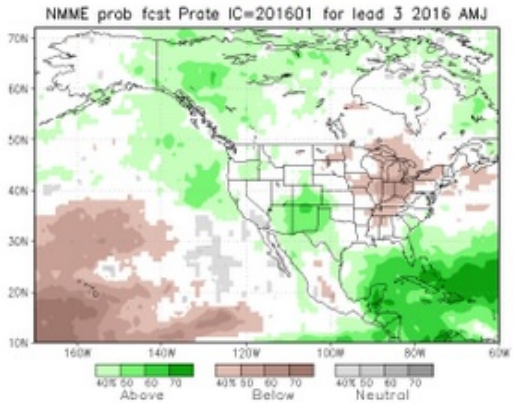




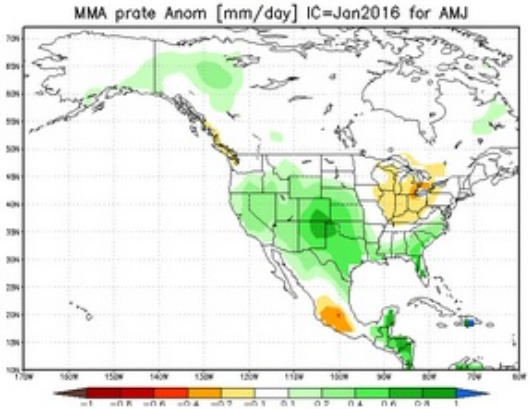
NMME



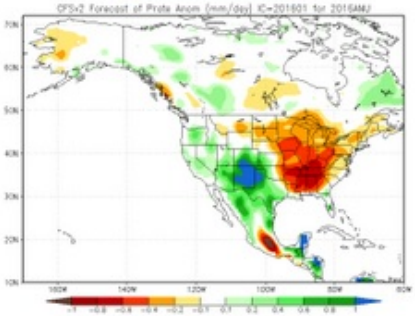
Prob fcst



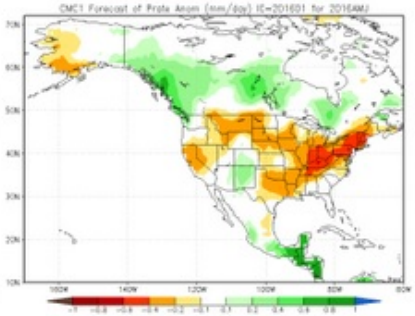
IMME



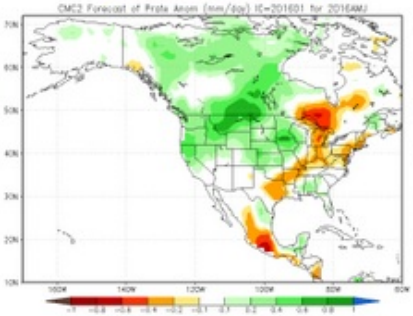
NCEP_CFSv2



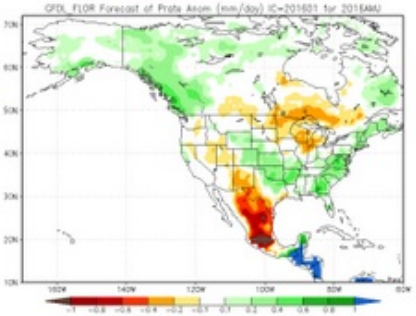
CMC1_CanCM3



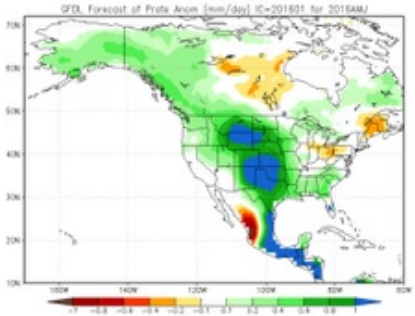
CMC2_CanCM4



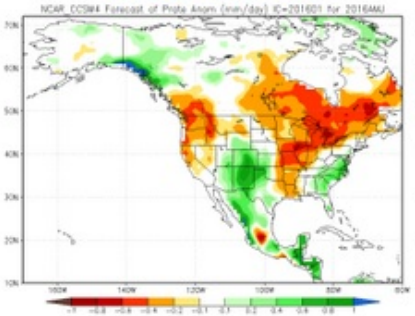
GFDL_FLOR



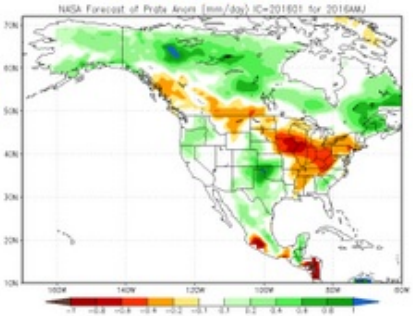
GFDL_CM2.1



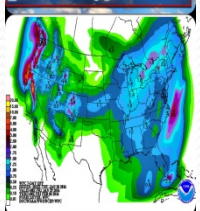
NCAR_CCSM4

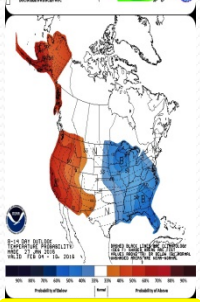


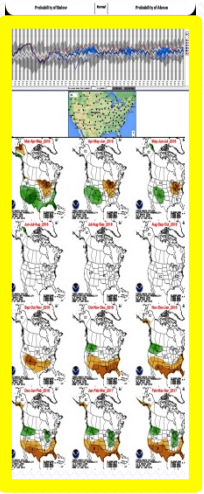
NASA_GEOS5



Seasonally

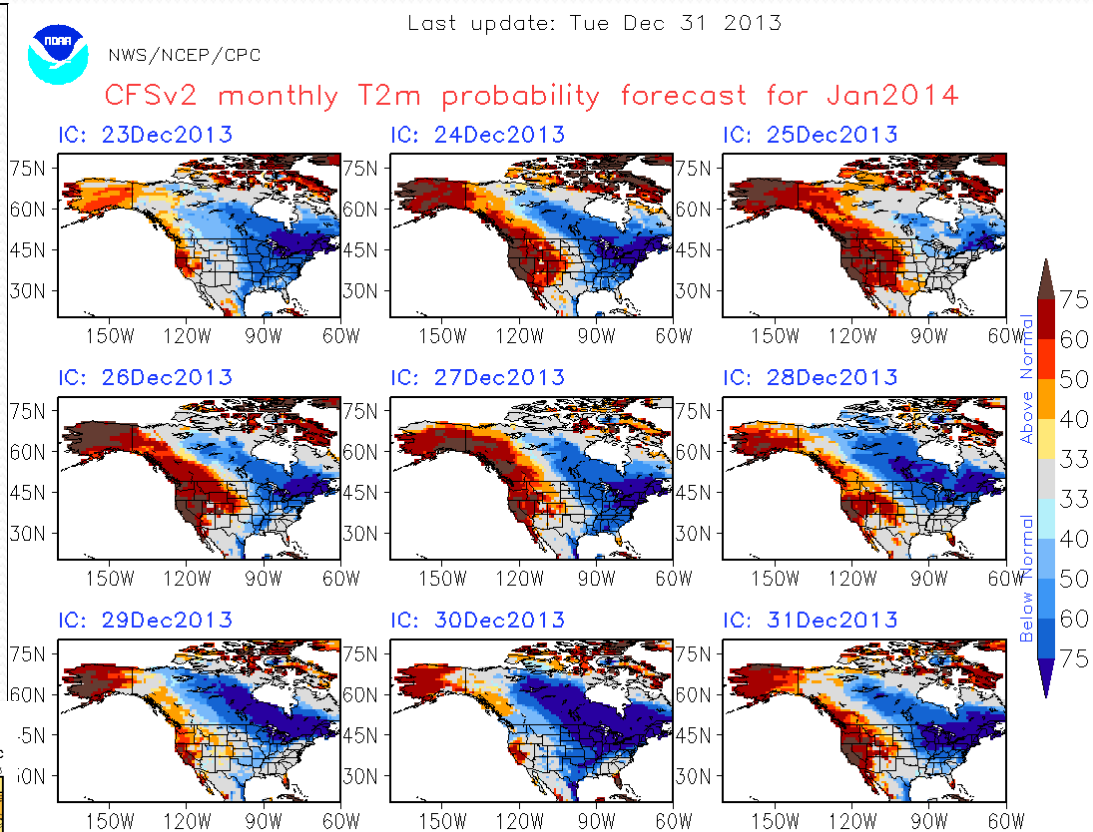


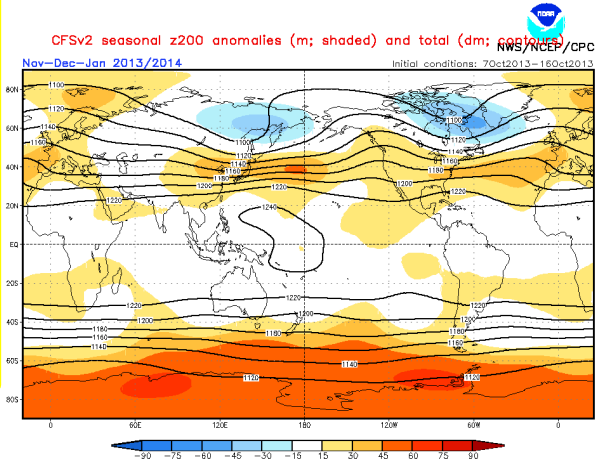




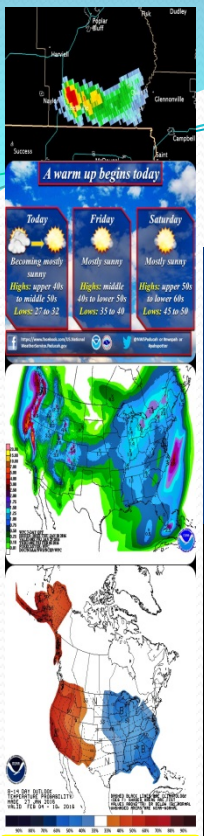
(1) ENSO and MJO
(2) Snow cover, soil moisture, local SSTS
(3) Statistical guidance
- CCA
- Constructed analogues
- Trends

(4) Dynamical



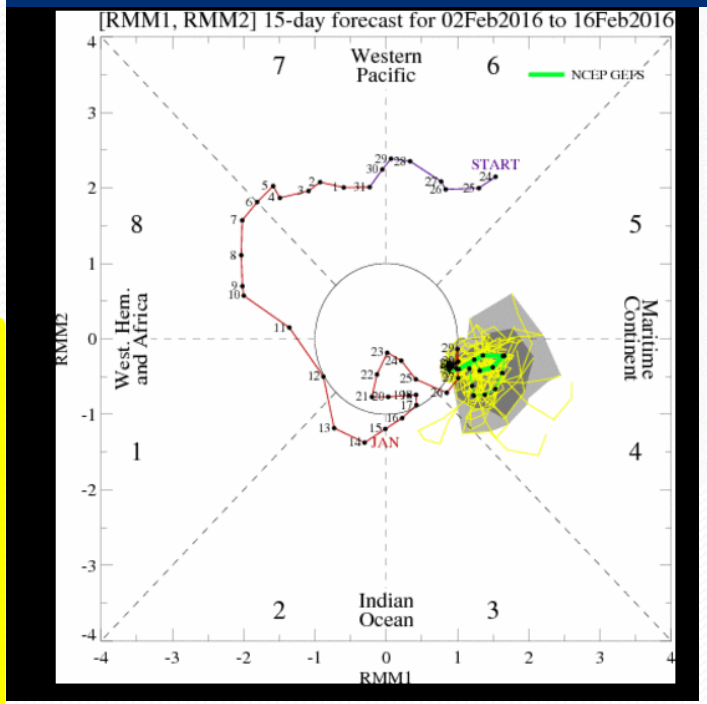


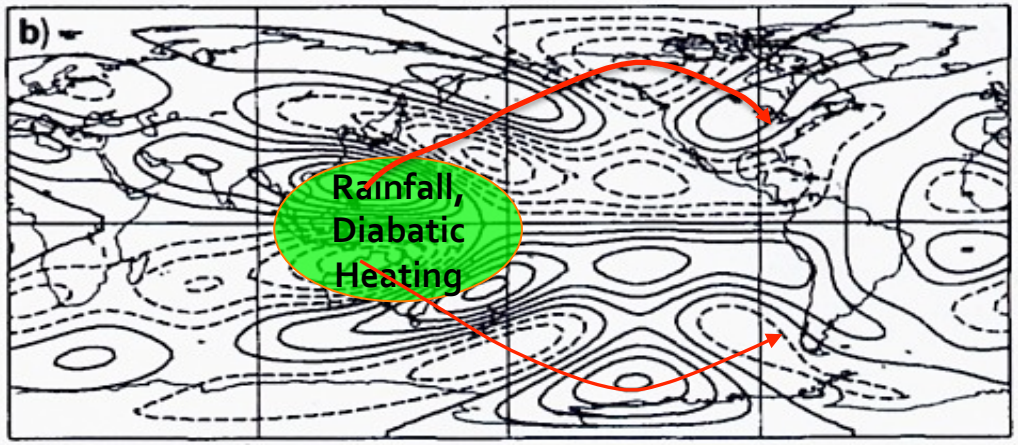
Also look at boundary forcing – snow fields, Local SST's (just off shore), soil moisture

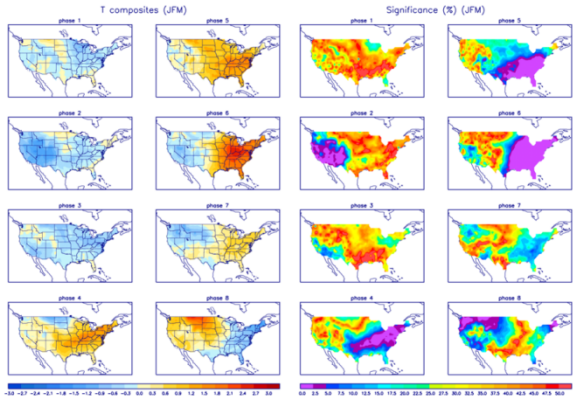


Seasonally - MJO

- Yellow Lines: 20 Individual Members, Green Line: Ensemble Mean
- RMM1 and RMM2 values for the most recent 40 days and forecasts for the next 30 days
- Light gray shading: 90% of forecasts, dark gray shading: 50% of forecasts

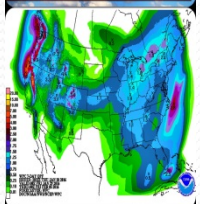


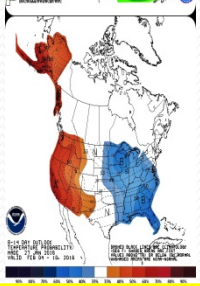


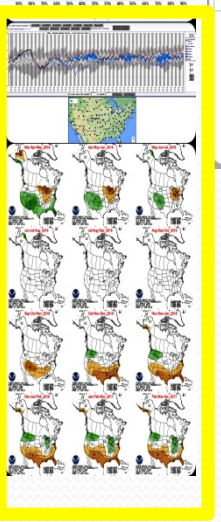


Predicting the MJO is easier than determing the effects downstream!

Long-Long-Long Range







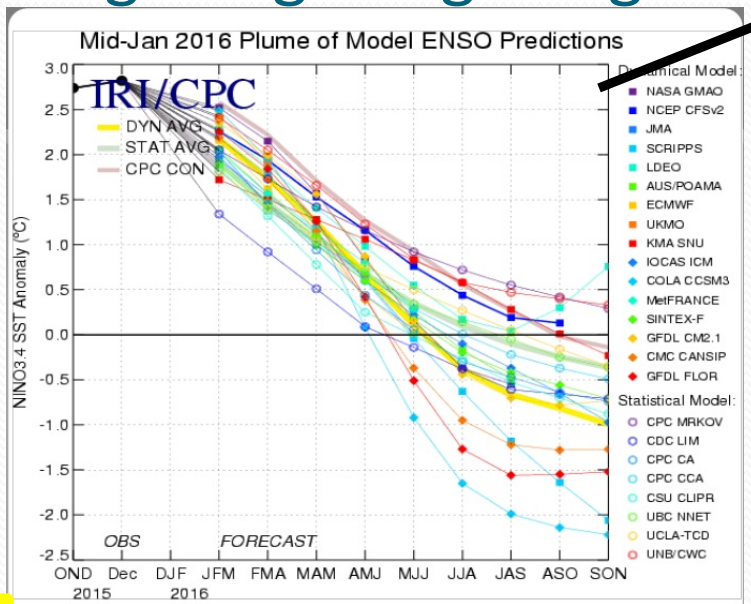
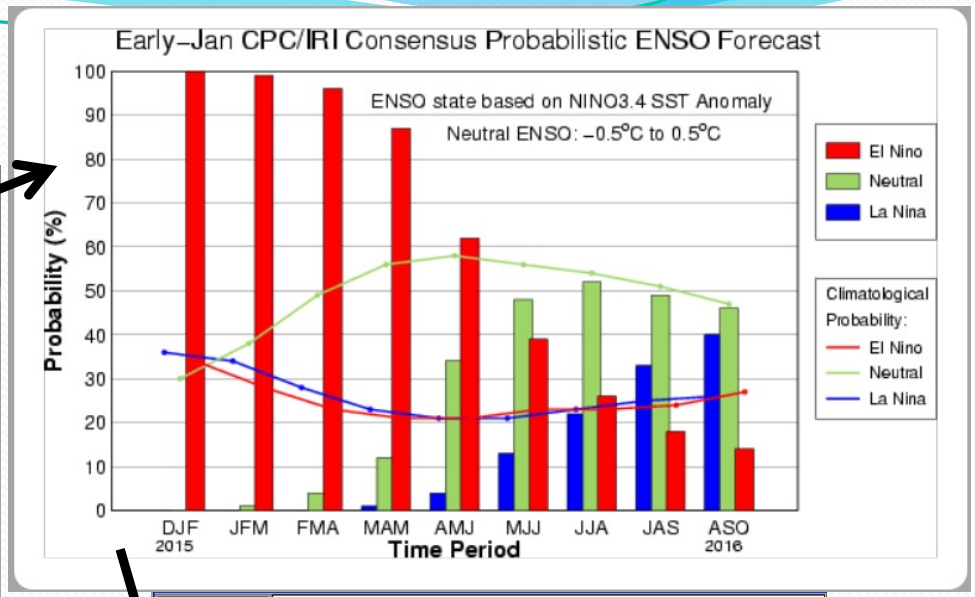
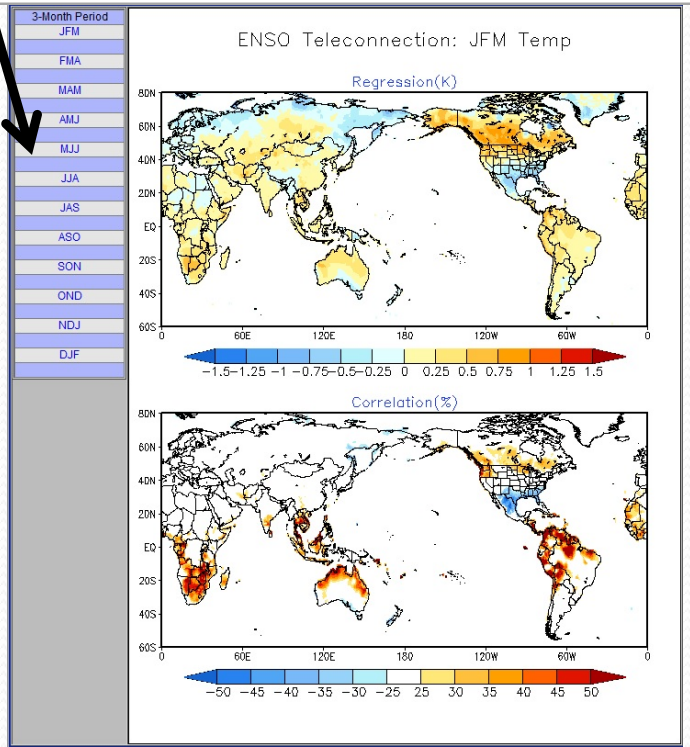
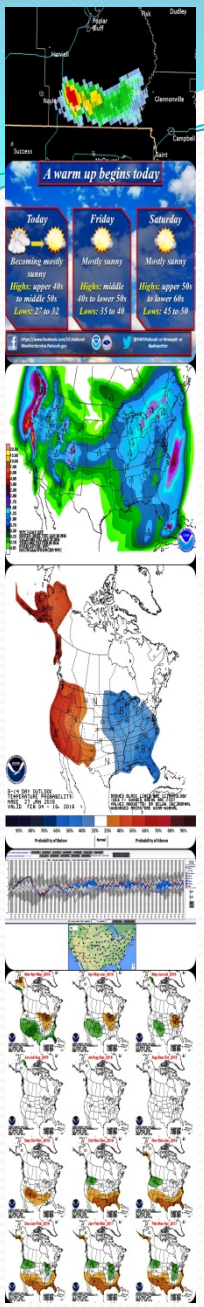


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 12 January 2016).

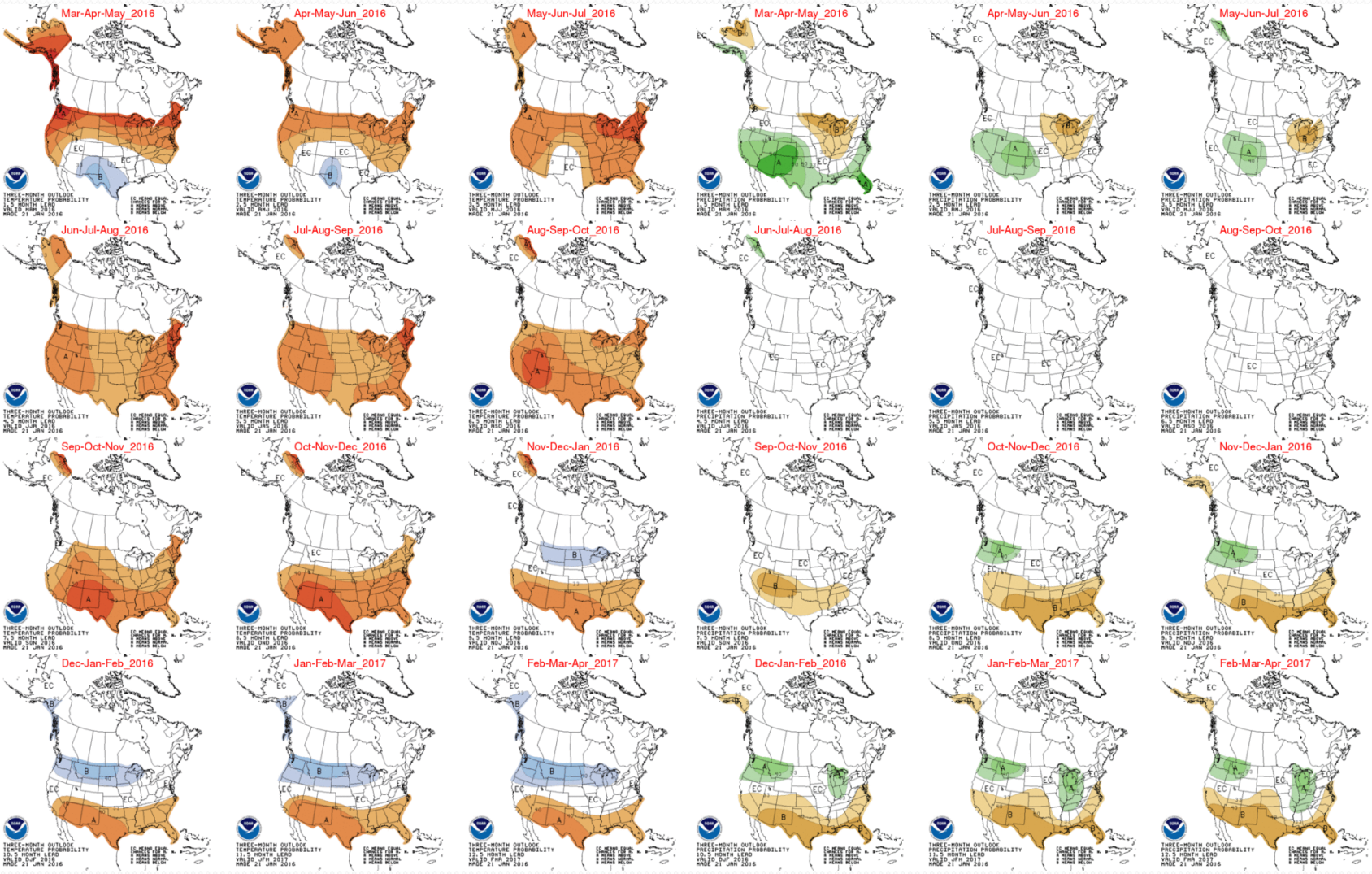




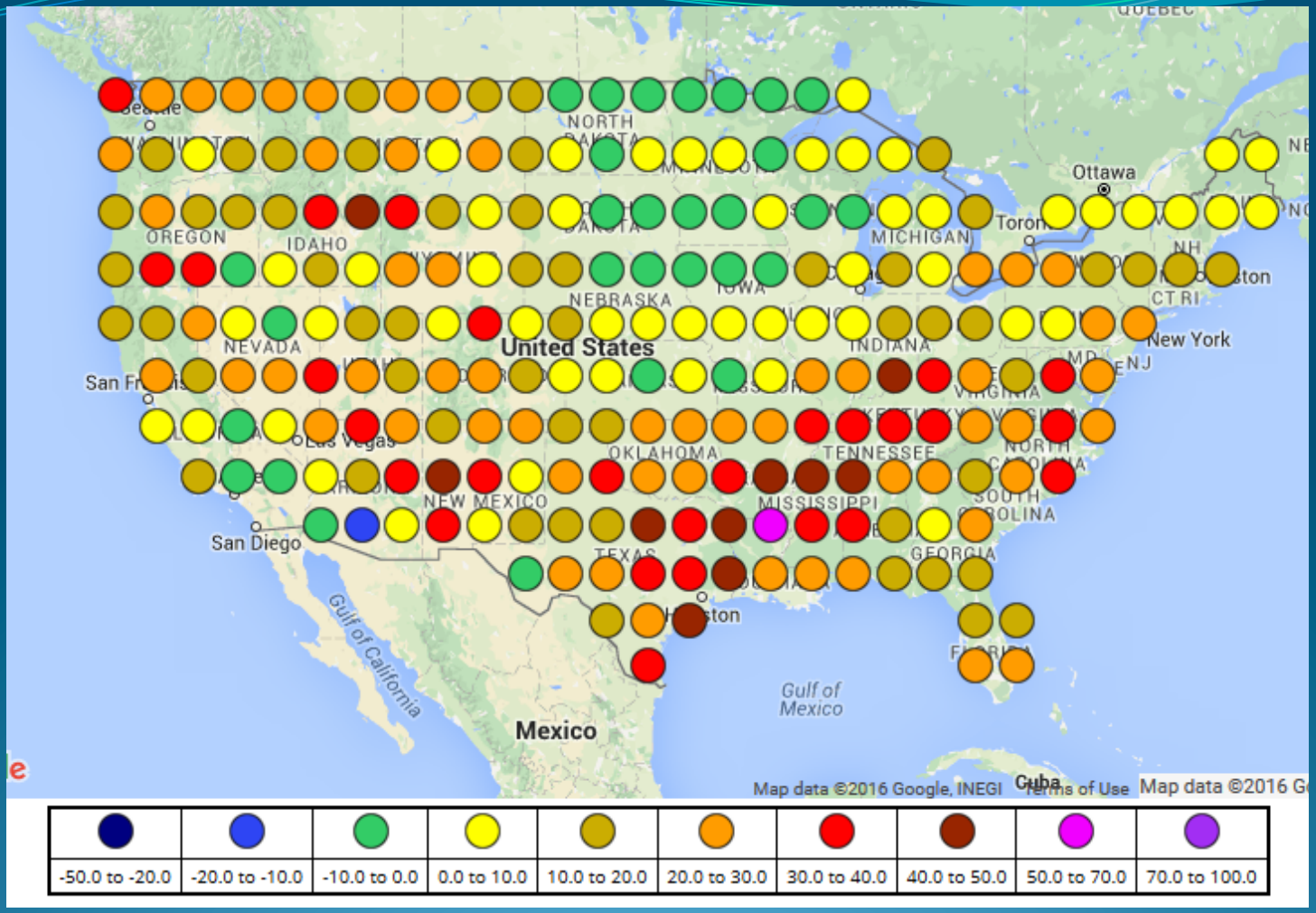
They also look for anomalies near the surface and in the upper levels (winds). Strong El Nino/La Nina can often produce specific patterns, whereas neutral conditions do not.


A warm up begins today
Today
Friday
Saturday

Results


Mar-Apr-May_2016
Apr-May-Jun_2016
May-Jun-Jul_2016
Mar-Apr-May_2016
Apr-May-Jun_2016
May-Jun-Jul_2016
Jun-Jul-Aug_2016
Jul-Aug-Sep_2016
Aug-Sep-Oct_2016
Jun-Jul-Aug_2016
Jul-Aug-Sep_2016
Aug-Sep-Oct_2016
Sep-Oct-Nov_2016
Oct-Nov-Dec_2016
Nov-Dec-Jan_2016
Sep-Oct-Nov_2016
Oct-Nov-Dec_2016
Nov-Dec-Jan_2016
Dec-Jan-Feb_2016
Jan-Feb-Mar_2017
Feb-Mar-Apr_2017
Dec-Jan-Feb_2016
Jan-Feb-Mar_2017
Feb-Mar-Apr_2017

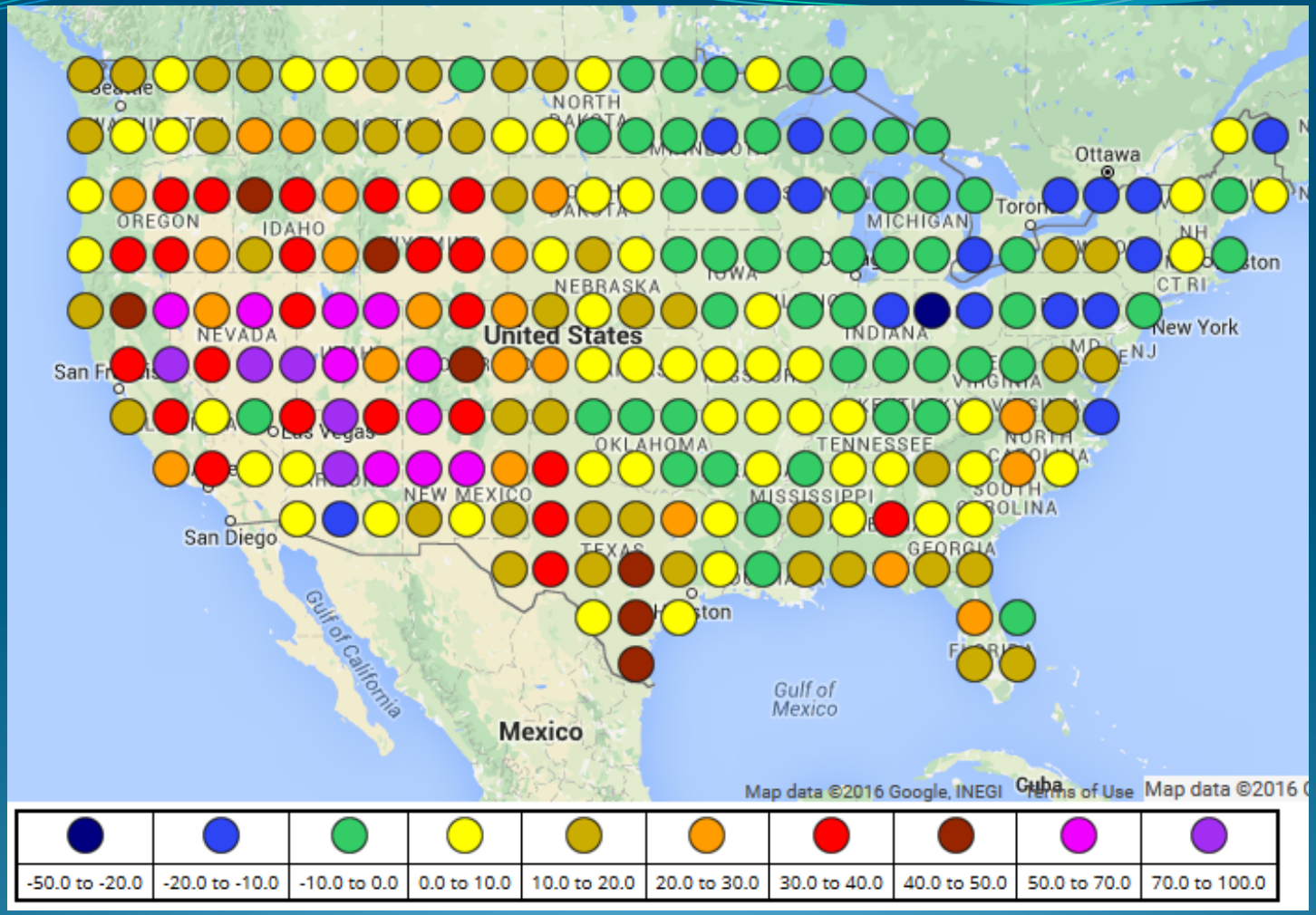
Temperature -- Dec-Jan-Feb



1995-2015 Seasonal Forecast Skill Map

Heidke Skill Score: Positive values indicate forecast skill, the higher the values the greater the forecast skill

Temperature -- Jun-Jul-Aug



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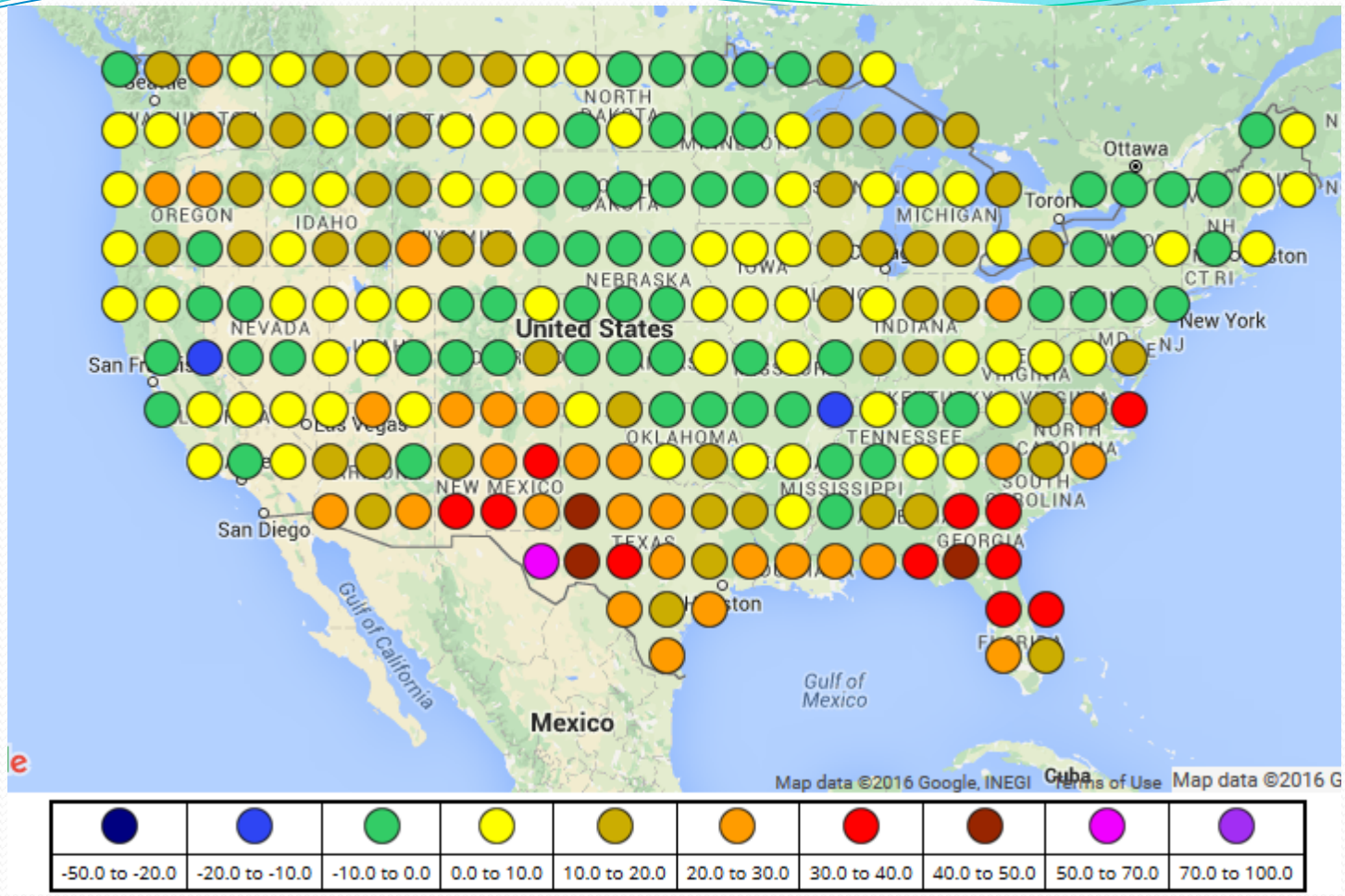
Precipitation -- Dec-Jan-Feb



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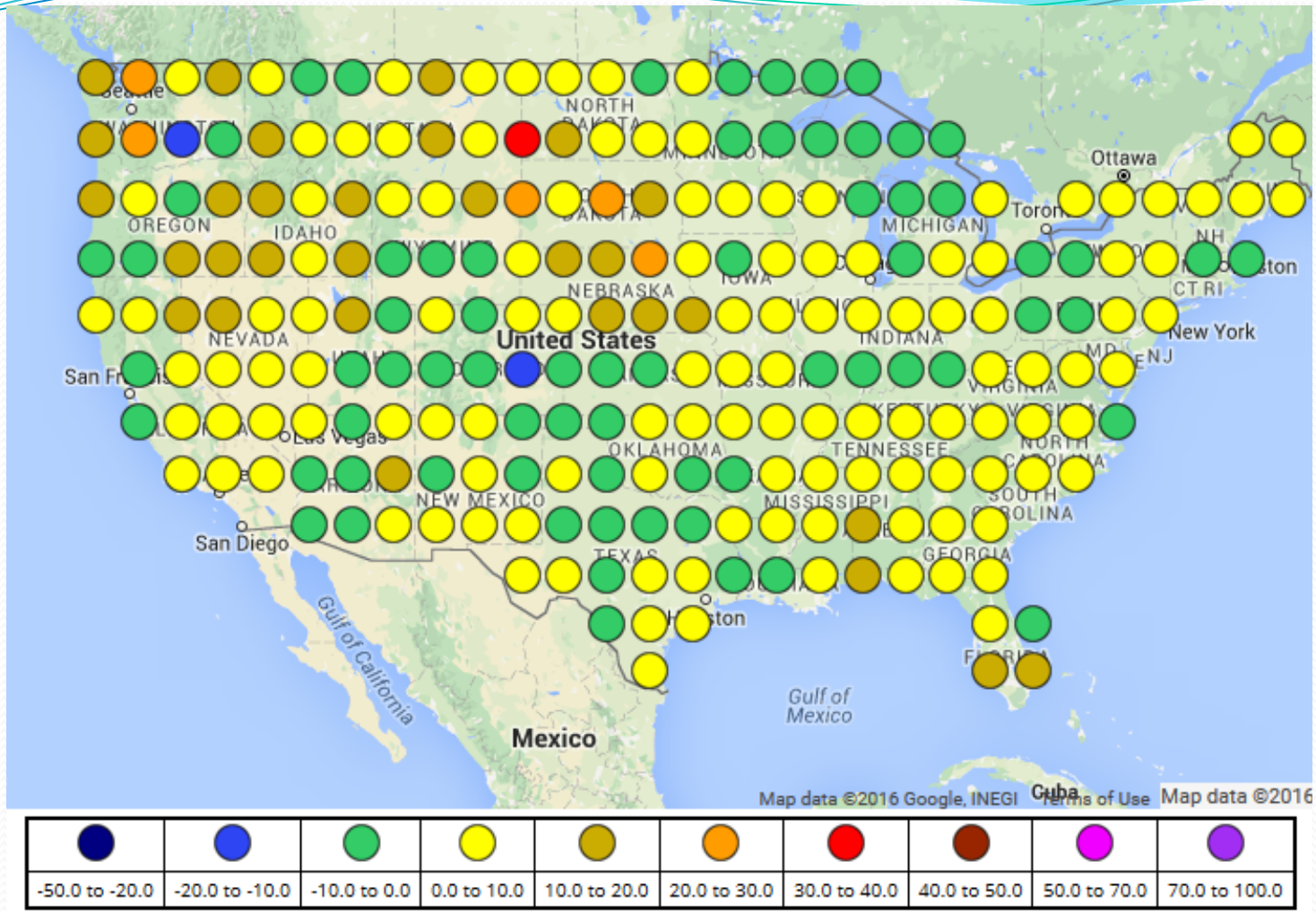
Precipitation -- Jun-Jul-Aug



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